

and joined together by a sealing seam, said cylindrical shape of said mat filter having an exterior diameter prior to introduction into said casing larger than an interior diameter of said filter casing forming an interference fit therebetween;

two end caps connected to said filter casing; and

one axial end of said mat filter being formed into a conical shape to facilitate introduction thereof in said filter casing;

whereby, said filter mat is supported directly on said filter casing and said supporting pipe.

REMARKS

By the present Amendment, claim 10 is amended. This leaves claims 10-24 pending in the application, with claim 10 being the sole independent claim.

Request to Withdraw Finality of March 15, 2002 Office Action and To Enter This Amendment

Applicants request that the "finality" of the March 15, 2002 Office Action be withdrawn since the finality is premature and the new grounds of rejection raised in the Office Action were not necessitated by Applicants' previously filed Amendment.

The December 27, 2001 Amendment responded to the September 5, 2001 Office Action. In that Office Action, claim 4 is objected to as being in improper multiply dependent form under 37 C.F.R. § 1.75(c), and is rejected as being indefinite under 35 U.S.C. § 112, second paragraph, but is not rejected under 35 U.S.C. § 102 or 103 in view of the cited patents. Only claims 1, 2 and 5-7 stand rejected under 35 U.S.C. . § 102 and/or . § 103 as being unpatentable over the cited patents. In response to this treatment of the claims, the December 27, 2001 Amendment submitted a new claim 10 combining the limitations of original claims 1, 3 and 4, thereby rewriting original claim 4

in independent form as explained in the penultimate paragraph on page 6 of that Amendment. Since claim 10 only recited subject matter that was previously contained in the original claims, the new ground of rejection was not necessitated by Applicants' Amendment, rendering the finality of the March 15, 2002 Office Action premature and improper.

During telephone interviews conducted by the undersigned with Examiner Ocampo on March 22 and March 26, 2002, the propriety of the finality of the March 15, 2002 Office Action was discussed based on the circumstances discussed above. Examiner Ocampo indicated that she would not withdraw the finality, but would likely enter and consider on their merits any claim amendments and arguments submitted in response to the final Office Action.

In view of the above, Applicants request that this Amendment be entered and considered on its merits, even though submitted after final rejection.

Rejection Under 35 U.S.C. § 103

Claim 10, as amended, covers a filter element comprising a fluid-permeable supporting pipe 10, a resilient filter mat 12, a plastic filter casing 16 and two end caps 20 and 22 connected to the filter casing. The mat filter is folded into a cylindrical shape and pushed open on the supporting pipe to surround and engage the supporting pipe. The plastic filter casing has openings 18, encloses the filter mat and delimits a filter chamber. A flat blank is used to form the filter casing with the opposite ends of the blank bent toward one another and joined by a sealing seam. The cylindrical shape of the mat has an exterior diameter prior to introduction into the casing larger than an interior diameter of the filter casing to form an interference fit between the filter casing and the filter mat. One axial end of the filter mat is formed into a conical shape to facilitate its introduction into the filter casing.

By forming the filter element in this manner, the filter mat is supported directly on the filter casing by the interference fit resulting from the relative dimensions of the filter mat and the filter casing. This support provides a filter mat which is free of play within the casing such as there is no gap or play between the outside of the filter mat and the inside of the casing. The presence of such a gap between the filter mat and the inside of the casing, as in the cited prior patents, is disadvantageous. Under working conditions, the fluid passing through the filter element will tend to move the filter mat, particularly the pleats thereof, adversely affecting the filtering capacity of the filter mat. Frictional forces between the filter element pleats will reduce the effective life of the filter mats. The claimed construction also provides a more compact filter element in which one pleat can support adjacent filter pleats.

The resiliency of the filter mat is disclosed in the original application by the description of the canceling out of the cone when the filter mat is introduced entirely into the closed filter casing as described in paragraph 25 and by the materials for the filter mat described in paragraph 28. Thus, the recitation of a "resilient filter mat" is fully supported in the application as originally filed.

Claims 10-22 presently stand rejected under 35 U.S.C. § 103 as being unpatentable over U.S. Patent No. 5,855,783 to Shucosky in view of U.S. Patent No. 3,460,680 to Domnick. The Shucosky patent is cited for a filter element 10 having a supporting pipe 14, a filter mat 20, folded into a cylindrical shape and wrapped about a surrounding pipe 14, and a filter casing having openings and defining a filter chamber between end caps 12 and 18. The Dominick patent is cited for a filter element having a plastic filter casing formed from a flat blank with opposite ends bent toward each other and joined by welding. In support of the rejection, it is alleged that it would have been obvious to use the Domnick casing on the Shucosky filter. The forming of the filter element exterior larger than the filter casing interior diameter and the conical end of the filter is considered

"an obvious modification". Additionally, in interpreting the claims, claim 10 is considered to be a "product-by-process" claim so that only the end product is considered, not the method of making it.

Claim 10 is patentably distinguishable over the Shucosky and Domnick patents by the filter mat having an exterior dimension larger than the filter casing interior diameter to form an interference fit between the filter mat and the filter casing. The statement of the rejection clearly admits that the Shucosky patent fails to disclose a filter mat having a larger exterior diameter than the filter casing interior diameter. Additionally, the claim 10 subject matter is patentably distinguishable over the cited patents by the forming of a conical shape in the filter mat to insert it within the filter casing to facilitate its introduction with the interference fit. This conical shape is also admitted to be absent from the Shucosky and Domnick patents. Both the claim limitation of the filter mat exterior diameter being larger than the interior diameter of the casing and the conical shape at one end of the filter mat are considered "an obvious modification". However, such limitations are not obvious modifications and would not result in the same filter element, as explained above.

As shown particularly in Fig. 5, the end of the filter mat is formed with a conical shape as it is introduced into the filter casing. This conical shape, along with the larger diameter of the filter mat relative to the filter casing inner diameter, provide an interference fit such that the filter mat tightly engages or is squeezed by the filter casing. In this manner, the filter mat is made to conform to the shape of the filter casing. The filter mat is free of any play relative to the filter casing and directly contacts the filter casing. In contrast, the absence of the interference fit between the filter casing and the filter mat in combination with the engagement of the filter mat on the supporting pipe in the cited prior patents, for example the Shucosky and Domnick patents, allows play and movement of the filter mat within the casing. This movement adversely affects the filtering

capacity. Additionally, frictional forces developed between the filter mat and the filter casing to reduce the effective life of the filter mat. In contrast, the present claimed invention provides an immobile, fixed filter mat having enhanced filtering and increased life. Further, the present claimed invention results in a compact filter mat wherein adjacent filter pleats are supported.

Nothing in the Shucosky or Domnick patents provides any motivation to vary the relative diameters of the filter mat and the filter casing. Moreover, no disclosure in these patents provides any suggestion or motivation to provide a filter mat with an exterior diameter larger than the interior diameter of the casing so as to provide the claimed interference fit. Such interference fit is a feature of the final product which is absent from the filter elements disclosed in the cited patents.

Accordingly, amended claim 10 is patentably distinguishable over the cited patents.

Claims 11-24, being dependent upon claim 10, are also allowable for the same reasons. Moreover, these dependent claims recite additional features distinguishing each of them independently over the cited patents.

Relative to claims 11-13, it is alleged that the joining by a heat seal or weld is a product-by-process limitation and not a structural limitation. However, such interpretation is clearly contrary to In re Garner, 162 USPQ 221, 223 (C.C.P.A. 1969), wherein the Court held that such seemingly apparent process limitations as "etched", "welded", and "interbonded by interfusion" are considered structural limitations not subject to the product-by-process rules. Thus, the decision of In re Thorpe, 227 USPQ 964 (Fed.Cir. 1985) is inapposite, since product-by-process limitations are not involved.

Claim 14 is further distinguishable by the pleating and folding of the filter, particularly within the overall claimed combination.

Claims 15 and 16 are further distinguishable by the weld and heat seal recited therein, respectively. These limitations are not product-by-process limitations, but are structural limitations.

In re Garnero, supra.

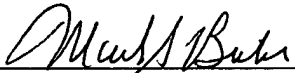
Claims 17-20 are further distinguishable by the use of recyclable plastic material, particularly within the overall claimed limitation. Relative to these limitations, the UN Environment Programme publication is cited with the contention that the disclosure of fluoropolymers as recyclable plastics renders making the filter casing of that material obvious. However, the cited publication does not relate to filtered elements or filters. As such, the cited publication does not provide the required motivation for modifying the Shucosky filter element to use such materials, thereby failing to provide a prima facie case of obviousness.

Claims 21 and 22 are further distinguishable by the punched out holes recited therein, particularly within the overall claimed combination. Such features are not rendered obvious by the additional citation of U.S. Patent No. 4,977,958 to Miller.

Claims 23 and 24 are further distinguished by the sealing seams having intermittent contact points (claim 23) or an overlapping area of the filter casing ends (claim 24), particularly within the overall claimed combination. Such features are not adequately taught or rendered obvious in view of the additional citation of U.S. Patent No. 3,560,131 to Yotsumoto. Further, such rejection involves the modification of a modifying reference, further demonstrating the unobviousness of the claimed subject matter.

In view of the foregoing, claims 10-24 are allowable. Prompt and favorable action is solicited.

Respectfully submitted,



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[MARKED-UP VERSION OF CLAIMS]

10. (Amended) A filter element, comprising:
- a fluid-permeable supporting pipe;
 - a resilient mat filter folded into a cylindrical shape and pushed open on said supporting [supportive] pipe to surround and engage said supporting pipe;
 - a plastic filter casing with openings enclosing said mat filter and delimiting a filter chamber, said filter casing being formed from a flat blank with opposite ends thereof bent toward one another and joined together by a sealing seam, said cylindrical shape of said mat filter having an exterior diameter prior to introduction into said casing larger than an interior diameter of said filter casing forming an interference fit therebetween;
 - two end caps connected to said filter casing; and
 - one axial end of said mat filter [is] being formed into a conical shape to facilitate introduction thereof in said filter casing;
 - whereby, said filter mat is supported directly on said filter casing and said supporting pipe.